stained with hæmatoxylin and eosin the lymphatics could be readily made out as vessels wide in comparison to the capillaries, and lined by a single layer of cells with clear protoplasm and flattened-out nuclei. A fine black line surrounded each of these cells in silver stains. Clear spaces were seen in the surrounding tissue, and often lay next to the clear endothelial cells of the lymph capillaries. The resulting appearance was that of an apparent opening in the wall of the lymphatics. That this was not actually the case could be shown in silver stains, followed by a nuclear stain where the intercellular spaces stained black and surrounded the clear spaces, each one of which proved to be a clear cell with central nucleus. These cells were branching, and without the nuclear stain suggested anastomosing channels. When the lymphatics were injected with silver solution the lymphatic vessels stood out in sections as a network of smooth-walled vessels, with a quite perfect lining of tessellated endothelial cells, and the intervening and surrounding tissue was not stained. From these observations the author concludes that the lymph canaliculi or "saft kanälchen" of Recklinghausen cannot be injected or in any other way demonstrated to be in connection with the lymphatics, but are cells whose outlines are stained with silver nitrate. When the lymphatics were injected with methylene blue, small extravasations of the blue fluid occurred along the course of the vessel if much force was used. Under the microscope these extravasations took place in a sudden explosive manner, and when pressure was made upon the specimen the lymphatics were emptied, but the extravasations were left unchanged. The process of development of the lymphatics appeared analogous to that of the bloodvessels. Sprouts of single cells or of several cells projected from the lymph vessels, and sometimes bridges of cells connected two vessels. The lumen was apparently formed by separation of parallel cells or from the hollowing out of a single cell. Experiments to determine the manner of transporting foreign granules showed that the process was carried on, as far as could be determined, entirely by phagocytic cells. Injections of granular material were made into the subcutaneous tissues of rabbits, and in sections made several days later through the lymphatic trunks relatively little free pigment was found. Almost all the granules were inclosed in cells.—W. T. L.

HYGIENE AND PUBLIC HEALTH.

UNDER THE CHARGE OF

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Ptomaine Poisoning.—From time to time cases of several members of a family, or a number of families suffering from acute poisoning after eating tinned meats, frozen rabbits, etc., are reported in the public press, and within the last few months they have been of rather frequent occurrence; but none has surpassed in severity and extent one in which nearly two hundred persons in widely distant parts of the country were attacked with pains, purging, and vomiting, with alarming prostration, and in several cases a fatal termination, after partaking of pork pies bought at or about the same time from one of the best shops in Derby. The manufacture of pork pies is the staple industry of Melton Mowbray, in Leicestershire, and these enjoy a European reputation; but those of many other makers in the north midlands are in no way inferior, and among them those of the firm in question stand deservedly high. There was nothing in the taste or appearance of the pies to arouse suspicion, but Professor Délépine found a bacillus resembling the B. enteritidis of Gaertner—in fact, that known as the B. Friedebergensis of Gaffky—and succeeded in extracting from the jelly a toxin fatal to guinea-pigs and rabbits. In this instance the poisonous character was common to the whole of the pies or to a large number of them, made at the same time, and must therefore be ascribed to the condition of the carcasses or to some unknown accident incident to the preparation of the pies in general, whereas it is more often peculiar to one among many.

Probably the most remarkable example of ptomaine poisoning was one reported in 1892 by the late Dr. E. Gwynn, Medical Officer of Health of Hampstead, and absolutely unique in its virulence. The food in this instance was one of the well-known Paysandu tongues, which a gentleman, his wife, and two children were about to partake of for breakfast. On opening the tin they remarked its somewhat dry appearance and the absence of jelly. He, noticing something unpleasant in the smell, forbade them to eat it, and proceeded to divide an omelette among them, using for this purpose the same fork. The wife and elder child, who had just tasted but had not swallowed the tongue, were seized about noon with symptoms closely simulating those of Asiatic cholera—pain, vomiting, involuntary watery evacuations, and collapse—the mother being for some hours cold, pulseless, and unconscious. The father and the other child, who had not tasted the tongue, and had merely eaten the omelette touched with the infected fork, were attacked in the afternoon with vomiting and faintness, and the child sank into a profound stupor, from which she could not be aroused for some hours. They all ultimately recovered, but for some time the life of the lady had been almost despaired of. Mr. Stokes, the analyst, found parts of the tongue softened, acid, and charged with tin and iron dissolved by the acid. Professor Macfadyen obtained therefrom cultures of the usual bacteria of putrefaction. Mr. Stokes' assistant, who put into his mouth a piece the size of a shilling, "to see how it tasted," suffered from vomiting and giddiness for thirty hours. Mr. Wynter Blyth endeavored by Brieger's method to extract some alkaloids, but without success, and the results of injections of solutions of the extract on guinea-pigs were negative, from which he concluded that the poison was a toxalbumin or enzyme—bodies at once the most virulent and the most unstable, and which had disappeared in the interval of five days that had elapsed between the opening of the tin and his experiments. He expressed the opinion that the failure of the most careful investigations after inquests on undoubted cases of meat poisoning may be thus explained.

Scurvy: A Chronic Ptomaine Poisoning.—The etiology of scurvy had long been one of the most obscure and vexing problems in pathology; but the hypothesis put forward a few years ago by Professor Tomp, of the University of Christiana, and advocated by MR. KOETTLITZ, Medical Officer to the Jackson Harmsworth Arctic Expedition, in the *British Medical Journal*, February 8, 1902, offers the only rational explanation, reconciling and rendering intelligible many apparently conflicting facts and experiences. Tomp and Koettlitz maintain that scurvy is nothing more or less than a chronic poisoning by ptomaines formed by certain bacteria in imperfectly preserved foods. Other factors may conduce to the production of the disease, not, indeed, as efficient causes, but as predisposing conditions, especially by diminishing the power of resisting or of destroying the poisons; and the well-known, though not infallible, prophylactic action of lime juice may be due to its in some way neutralizing or antagonizing the toxins.

It is a fact that a continuous diet of salt beef or pickled pork, especially when these preserved meats have been kept for many months, is almost inevitably followed by the appearance of scurvy in a ship's crew, and that it never arises among those who enjoy a diet of fresh meat, vegetables, and fruit, and rarely when, in default of these, or when they can be supplied at intervals only, the diet consists of good tinned meats and vegetables, with the addition of sound dried fruits, vegetables, with potatoes and lime juice.

Other organic acids, even vinegar, are reputed to possess some antiscorbutic properties, and Dr. Neale, of the steamship Eira, claimed for draughts of fresh blood the exemption of the crew.

But in some Arctic expeditions in which the food was entirely or almost entirely preserved, but by the absolute exclusion of the air after complete sterilization, as those of Professor Nordenskjold and Dr. Nansen, not a trace of scurvy appeared in the course of three or four years. More striking still was the experience of the Jackson Harmsworth expedition. The exploring party, who partook at least once daily of fresh meat in the form of bear's flesh, enjoyed perfect health; while those who remained on board their ship, though taking their doses of lime juice every day, suffered without exception from scurvy, of whom two died. But it is to be remembered that they frequently remarked on the decidedly "high" or "gamey" taste and smell of the meat when the barrels were opened, and they could not be induced to eat fresh bear's flesh on account of its coarseness and peculiar flavor.

In fact, whatever else they had, the meat contained more or less of the ptomaines; while their comrades on land, though with less variety and without any lime juice or other reputed antiscorbutics, did not suffer from ptomaine poisoning, the flesh on which they mainly subsisted being perfectly fresh. So, too, Nansen and Johannsen did not suffer in the least during their sixteen months' solitary sojourn in Franz Joseph Land, though they had no vegetable food whatever, and, unlike the exploring party of Harmsworth's expedition, lived entirely on the flesh of the bears they killed; and we may assume that the crew of the Eira would have enjoyed no less freedom from scurvy without having had forced on them the repulsive draughts of raw blood. Nansen's crew, on the other hand, being for three whole years, whether free or ice-bound, on the high seas, had no opportunity of obtaining fresh meat, but were entirely exempt from scurvy, thanks to the excellent preservation of their food.

Like Nansen himself and his companions, the members of Leigh Smith's expedition, twenty-five in number, who were wrecked on Franz Joseph's Land in 1881, and wintered there under the most miserable conditions, subsisting for a whole year on a diet exclusively of fresh and often raw flesh, maintained their health to the last.

The peasants in Russian Lapland, though able to obtain farinaceous, saccharine, and vegetable foods, suffer much from scurvy, for the fish which constitutes the nitrogenous part of their diet is generally more or less tainted, from imperfect preservation in winter and from an acquired preference for the taste of "high" fish in summer.

In short, the whole theory of the possession by any foods or drugs of antiscorbutic properties as such is a delusion. No food, if perfectly free from incipient putrefaction, whether it be fresh or preserved in an aseptic state, will cause scurvy; nor under such conditions will hardship, exposure to cold, depressing mental surroundings, or physical discomfort conduce thereto. On the other hand, incipient putrefaction, if it be so far advanced as to produce any change in the flesh perceptible to the taste or smell, will certainly—and even if it be not may sooner or later—give rise to that form of chronic ptomaine poisoning known as scurvy.

The etiology of infantile scurvy or scurvy rickets (Barlow's disease) is not touched on by Mr. Koettlitz, and does not at first sight seem to admit of so simple an explanation; but since it never occurs in infants at the breast, it is not unreasonable to assume that ptomaines of a kindred nature may be produced in artificial foods by the bacteria in the milk with which these foods are prepared.

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